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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/071,341	02/08/2002	J. Yong Ryu	CDT 1694	2354

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EXAMINER

GRIFFIN, WALTER DEAN

ART UNIT

PAPER NUMBER

1764

DATE MAILED: 08/25/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/071,341

Applicant(s)

RYU ET AL.

Examiner

Walter D. Griffin

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 July 2003.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7 and 8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7 and 8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

The objection to the declaration as described in paper no. 3 has been withdrawn in view of the submission of the new declaration on July 3, 2003.

The claim objections and rejections under 35 USC 112, second paragraph, as described in paper no. 3 have been withdrawn in view of the amendment filed on July 3, 2003.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 4 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Allender (US 2,314,435).

The Allender reference discloses a process for upgrading a C₄ hydrocarbon stream. The process comprises introducing the hydrocarbon stream that contains isobutane and normal butane into a separation zone such as a fractional distillation column to separate the isobutane from the normal butane. A portion of the normal butane is then passed to a dehydrogenation unit in which normal butene is produced. Another portion of the normal butane is passed to an isomerization unit in which isobutane is produced. The isobutane recovered from the separation zone is passed along with the normal butene produced in the dehydrogenation zone to an alkylation zone to

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form an alkylate. This alkylate would necessarily contain a branched alkane. See page 2, left column, line 69 through page 3, left column, line 62.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Allender et al. (US 2,314,435) in view of Vora (US 4,520,214).

The Allender reference discloses a process for upgrading a C₄ hydrocarbon stream. The process comprises introducing the hydrocarbon stream that contains isobutane and normal butane

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into a separation zone such as a fractional distillation column separate the isobutane from the normal butane. A portion of the normal butane is then passed to a dehydrogenation unit in which normal butene is produced. Another portion of the normal butane is passed to an isomerization unit in which isobutane is produced. The isobutane recovered from the separation zone is passed along with the normal butene produced in the dehydrogenation zone to an alkylation zone to form an alkylate. This alkylate would necessarily contain a branched alkane such as isooctane. See page 2, left column, line 69 through page 3, left column, line 62.

The Allender reference does not disclose the selective hydrogenation of dienes in the dehydrogenation zone effluent and does not disclose utilizing a C₅ stream as in claim 8.

The Vora reference discloses the selective hydrogenation of dienes contained in a dehydrogenation zone effluent stream. See column 1, lines 7-19; column 2, line 37 through column 3, line 20; and column 4, lines 41-53.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Allender process by selectively hydrogenating dienes in the dehydrogenation zone effluent as suggested by Vora because dienes that react downstream to produce undesired products will be removed thereby limiting the production of undesired products.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Allender by utilizing a C₅ stream instead of the disclosed C₄ stream because a C₅ stream would be expected to be similarly converted to useful products in the process of Allender since a C₅ stream is chemically and physically similar to the disclosed C₄ stream.

Response to Arguments

The argument that there is no teaching or suggestion to combine the Allender and Vora references is not persuasive. It is clear from the disclosure of Vora that diolefins are a by-product of alkane dehydrogenation processes and that these diolefins are undesirable in the dehydrogenation zone effluent because the diolefins react in downstream processes to produce undesired products. Although Allender does not mention the presence of diolefins in the dehydrogenation effluent, from the teaching of Vora, one of ordinary skill in the art would expect diolefins to be present to some extent in the Allender dehydrogenation zone effluent. Therefore, the examiner maintains that one would combine the teachings of the references with the expectation that the Allender process would be improved by removing undesired diolefins from the dehydrogenation zone effluent.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

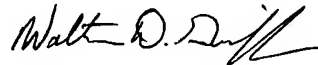
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter D. Griffin whose telephone number is 703-305-3774. The examiner can normally be reached on Monday-Friday 6:30 to 4:00 with alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.



Walter D. Griffin
Primary Examiner
Art Unit 1764

WG
August 13, 2003